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of the two degenerate digits. But I think the evidence is not sufficiently conclusive to warrant his interpretation. The skeleton which I have examined is more than two thirds complete, much crushed, and but few of the phalanges are articulated. It seems quite possible to interpret the phalangeal formula in conformity with other Trachodont skeletons in which the phalanges, being not only fully articulated but enclosed within the web of the skin, are not open to any possibility of error.

In Plate II. showing what Mr. Lambe considers the natural position of the elements the terminal hoof of IV. is evidently II.³ and V.² is not a terminal as I have determined by examination.

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November 20, 1913

AGRO-DOGMATOLOGY

IN SCIENCE of October 3, 1913, there appears under the title "The Bread Supply" a veritable vegetable cell containing a *nucleus* in the form of a quotation from an address by Professor Bolley; some *cytoplasm* of somewhat alkaline reaction provided by Professor Hopkins; *chromatophores* for which various experiments are called upon to furnish local color; *metaplasm* containing a conglomeration of non-essentials, incidentals and chemical dogma; scarcely enough juice to fill even a small *tonoplast*; an impermeable *ectoplasm*—the whole cell suffering from extreme plasmolysis resulting from the toxic fumes arising from very decadent notions of "plant food."

Professor Hopkins refers with "deep respect" to "the science of biochemistry, as the chief means of making plant food available." With such a conception of its nature it would be better to refer to biochemistry with reverence—an attitude of mind often assumed towards the unknown. The biochemist and plant physiologist might well say to Professor Hopkins, as did the Lord to Moses, "Put off thy shoes from off thy feet, for the place whereon thou standest is holy ground."

We are told that Jensen devised a method for "the destruction of fungous diseases some-

times carried in seed grain." I do recall that Professor Jensen developed the so-called "hot water" method for the destruction of the spores of certain fungi known to cause diseases of certain cereals. When such simple facts regarding plant pathology are available in even our elementary text-books it is evident that "no state in the union can afford . . . to have the minds of its farmers and land owners befogged in relation thereto."

In making analyses of commercial fertilizers, soils, ores and similar materials the "analytical chemist" still plays an important rôle; he may even assist in prolonging human life by detecting sodium benzoate in our canned tomatoes, but no one seriously expects him to fully comprehend, even "two or three centuries after its discovery," the relation of the plant to its environment. In "belittling" the work of the analytical chemist in this connection even a hundred columns of words are not so effective as a comparison with the actual achievements of the biochemist and the plant physiologist.

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SCIENTIFIC BOOKS

Nervous and Mental Disease Monograph Series. Edited by DRs. SMITH ELY JELLIFFE and WM. A. WHITE. Published by the Journal of Nervous and Mental Disease Publishing Company, New York.

This series, it is announced, "will consist of short monographs, translations and minor text-books." To judge by the rapidity with which the successive numbers have appeared and by the promptness with which the editions have become exhausted, the undertaking is certainly well conceived. The first 15 numbers include White's excellent "Outlines of Psychiatry," a condensed text-book of 300 pages; "Mental Mechanisms" by the same author; Franz's "Handbook of Mental Examination Methods," and two other original papers, the remaining numbers being translations. Of these, one of the most important is Kraepelin's study of "General Paresis." There are

several translations of works of the "psycho-analytic school," including Freud's "Selected Papers on Hysteria and Other Psychoneuroses" and "Three Contributions to Sexual Theory." The editors of the series, being themselves interested in this movement, are helping to make the psychoanalytic authors accessible in English. As the limits of this review evidently do not admit of an analysis of the whole series of papers, we may confine ourselves to a few remarks on Freud and his school. The two numbers translated from Freud perhaps give as good an insight into the core of his doctrine as could be had in small compass. It is, however, characteristic of this author that cross references are very important in getting his meaning. Everywhere there are gaps in the argument that need to be supplied from some other paper or book; in fact, a reading of all Freud's works still leaves the impression of unbridged gaps, jumps in the thought and incompleteness of evidence. Quite possibly, these deficiencies are inherent in the doctrine at its best, but it is at least to be hoped that some Freudian with a taste for orderly exposition should show what can be done towards giving this fascinating theory a scientific dress.

The whole scope of the Freudian doctrines is very far-reaching, involving a treatment of hysteria and other psychoneuroses, a theory of the mechanism of these disorders, certain significant views on normal as well as pathological mentality, and even certain strictures on the ethics of civilized society. In his psychology, Freud lays stress on the importance of repressed desires, and on the devices by which these desires, though relegated to the "subconscious," yet contrive to express themselves in dreams (every dream being a dramatized or symbolic fulfilment of a repressed wish), in witticisms, and in slips of memory and similar lapses. He is fond of insisting that lapses and apparent irrelevances and extravagances of thought or action do not occur without a cause—by which he means that they do not occur without an emotional and volitional cause. We forget a

name because, subconsciously, we wish to forget it, we make a slip of the tongue because some subconscious wish expresses itself in this way, we indulge in witticisms because by them we can give expression to wishes which social custom forbids us to express directly, or which we even do not acknowledge to ourselves. Now society is specially insistent on the repression of sexual wishes; and for this reason, and because sex is a dominant factor in human make-up and because man is driven to "sexualize everything," the repressed wishes which express themselves in dreams and lapses are chiefly and fundamentally of a sexual nature. Furthermore, the repression of sex motives begins early in childhood, for the child is not the sexless creature that he is often supposed to be, but is, on the contrary, strongly sexed from the very start. In part, his sexual proclivities are self-centered and do not drive him to persons of the opposite sex—an infantile condition which persists in some individuals in the form of sexual perversions—but in part, the polarity of the sexes appears already in the young child, so that the boy is sexually attracted to the mother and becomes in his own mind a rival of the father. These sexual proclivities, being socially repressed from a very early age, generate submerged emotional "complexes" which persist from childhood to adult life and form the deepest stratum of that subconscious life of desire which finds expression in dreams, etc. Thus the full analysis of a dream or lapse leads to a suppressed wish, to a sex motive, and ultimately back to the sexual life of childhood. Suppression, sex and infantilism are the three fundamentals of the Freudian psychology.

This psychology is readily applied to the explanation of hysteria, or rather it grew out of a study of hysteria. The "attacks" and other abnormal behavior of hysterics are, like dreams, the expression of repressed sexual wishes dating back to childhood. Often some shocking or disappointing experience of a sexual nature has been repressed from memory, but its "affect" or emotion remains and

invents some substitute for the suppressed memories, thus giving rise to the tics, paralyses, pains, anesthetics and amnesias which continually torment the patient, while occasionally the repressed memories, bursting through the barriers of suppression, take control of consciousness and produce the "attack."

The treatment of hysteria is, accordingly, to discover the suppressed memories and wishes, and satisfy them by "abreaction." The wish must be dealt with in the full light of consciousness. The reaction to it need not be the direct accomplishment of the wish in its original form, but may be "sublimated." The reaction may consist in the quasi-sexual relation between the (usually female) patient and the psychoanalyst, a relation carefully guarded and yet perfectly frank, in which sexual wishes are openly acknowledged and the memories connected with them are ferreted out and rehearsed at length. It is to the method adopted for ferreting out the repressed wishes and memories that the term "psychoanalysis" is most directly applied. The plan is to remove the repression as far as possible, and let the patient's thoughts move freely, in the hope that they will move towards what is repressed. Often a dream of the patient is taken as the starting point, and he is asked to let his thoughts play freely about the items of the dream. This free play of thoughts is called "free association"; but since association is seldom, if ever, perfectly free, the process needs to be examined a little more closely in order to find out what "control" is exerted upon association. The subject is encouraged to look for something emotionally significant and for something which he is tempted to repress; eventually, his thoughts are steered in a sexual direction. The operator, convinced beforehand that this is the direction in which fruitful results are to be found, more or less overtly steers the patient's thoughts. This analysis of the patient's subconscious wishes and memories is a time-consuming process, and of late there is an increasing tendency to take short-cuts by the use of dream symbolism. It appears that certain objects dreamed

about, gardens, snakes, stairs and a host of others, are fixed sexual symbols, and, being so interpreted by the operator, enable him to make rapid strides at the beginning of his analysis.

The above inadequate account of Freud's teaching scarcely affords a basis for appraising its scientific or practical value. At the present time, the data are simply not at hand for such an appraisal. Current discussion of the doctrine has not yet reached the level of scientific consideration. The opposition has been characterized by derision and indignation, and the counter-argumentation of the Freudians by repartee rather than by evidence. From the Freudian point of view, opposition is to be expected because men are unwilling to admit their own repressed complexes and the extent to which their lives are dominated by sex. This indicates the manner in which Freudians handle their opponents, and it is certainly not a manner calculated to lead to dispassionate consideration. The result is that there is not a point in the whole Freudian system which can be regarded as either proved or disproved. The evidence as presented by the Freudians is too full of jumps and gaps to be logically convincing, and it would seem that those who embrace the doctrine—as several eminent neurological practitioners, especially in this country, have embraced it—have been not so much convinced as converted—that they have adopted Freudism as a faith, finding it justified by its works, and desiring themselves to practise these works. In other words, they have found the *treatment* efficacious; and the principal argument in favor of the doctrine has been the success of the treatment. (It should be said that there are decidedly two opinions regarding the value of the treatment, and the present reviewer is in no position to pass judgment in this matter.) The weakness of this argument is that it would prove the truth of many rival systems—animal magnetism, Christian Science, "new thought," divine healing, Yoga, osteopathy—each of which meets with appreciable success in treating hysterical and other neurotic cases. Consid-

ered as a scientific hypothesis, the doctrine of Freud suffers from the disability that it apparently can not be put to a crucial test; for whichever way the test came out, the Freudian would find in the result a confirmation of his views. For example, a dream is always the expression of a repressed wish; but if a particular dream that is brought forward seems not to be the expression of a wish, it can be regarded as expressing the wish that the Freudian doctrine be not confirmed, or as expressing a subtle and subconscious opposition of the patient to the operator. Or, again, the open expression of sexual interests by a young child is clear evidence in favor of "infantile sexuality," while the absence of such expression is an evidence of "repression." It is somewhat disconcerting to find that what is ostensibly a psychological hypothesis, to be tested, is in reality a faith to be embraced or rejected.

The sociological implications of the Freudian conception are obvious. Nervous disturbances and much minor mental inefficiency, being due to the repression of sexual motives which is enjoined by civilization, point the way to a reform of society in the direction of greater tolerance and freedom for sexual impulses.

Even anthropology is invaded by the psychoanalysts. Myth and folklore are regarded by them as phenomena analogous in the race to the dreams of an individual, and as expressing in symbolic form the repressed wishes of the race and especially of the childhood of the race. All myths are therefore fundamentally sexual. This line of interpretation, originated by Freud himself, is represented in the present series by Abraham's paper on "Dreams and Myths," which considers especially the story of Prometheus, and endeavors to show that in its earliest form it had distinctly a sexual meaning, later overlaid by more "refined" interpretations. The fire of Prometheus is a sex symbol. Abraham's treatment has one or two obvious weaknesses. He fails to show that repression of sex matters was so strong in the childhood of the race as to create a need for symbolic expression—for it must

be remembered that the symbol, according to Freud, comes into play when direct expression is not allowed by the personal or social "censor." This censorship is usually regarded as a characteristic—and defect—of civilization, and why then should it be carried away back to the origin of myths? Even grant the dictum, probably exaggerated, that "man sexualizes everything," we need not conclude that the sex motive is always repressed, to reappear in symbolic form. Fully as plausible would be an exactly opposite, though still sexual, theory of myths, namely, that primitive man, being familiar with reproduction, used it as a symbol or paradigm for interpreting other natural phenomena, so that the sex idea, instead of requiring indirect expression in terms of fire, etc., itself furnished the means for expressing primitive ideas regarding these other phenomena. When, for example, the early Greeks inquired regarding the "physis" or generation of the world, they were using reproduction as a basis for conceiving world processes. Other phenomena were not employed as symbols for sex, but sex was used as a symbol for other phenomena.

If all these ramifications of the psychoanalytic views were modestly put forward as tentative hypotheses, they would awaken interest; and if they were thoroughly worked out and made as precise and systematic as possible, they would deserve serious consideration; but, as a matter of fact, they are presented at once with characteristic sketchiness and cock-sureness. It is a little surprising to find practical physicians interesting themselves in myths and fairy tales. Their reason is thus stated in the preliminary announcement of *The Psychoanalytic Review: A Journal Devoted to an Understanding of Human Conduct*, edited, like the Monograph Series here under review, by Drs. White and Jelliffe and published also by *The Journal of Nervous and Mental Disease*, the first number bearing date of October, 1913: "Briefly stated, the hypothesis which attempts to fathom the laws governing human conduct is the principle that has already done service in the field of biology. It is the recapitulation hypothesis that ontog-

eny is a condensed phylogeny. . . . The mind as it is to-day, like the body as it is to-day, can only be adequately understood in the light of its developmental history throughout the ages of the past. . . . The fields of comparative theology and comparative mythology, of folklore and fairy tales, are rich in material of very practical significance in our present-day problems. . . . Mental disease in its destructive results brings the individual back to primitive and archaic methods of reaction,—reactions which may be better understood when we have studied the mind of primitive man and seen there what they mean.” It is certainly satisfactory to psychologists and anthropologists to find their subjects thus enlisting the interest and cooperation of a large body of physicians, and the only apprehension is that the psychoanalytic method, applied in the armchair to the records of primitive man, may appear to the working anthropologist as somewhat lacking in directness and thoroughness.

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The Venom of Heloderma. By LEO LOEB.

Few portions of the world where reptiles occur at all are without some species of serpent venomous enough to be dangerous to human beings. The nature and mode of action of the poison of various serpents has, therefore, been of much practical interest and has attracted the serious attention of investigators in many lands. Nearly all lizards, on the contrary, are harmless. Indeed, the only species known to be venomous are the two kinds of Gila monsters found in Mexico and on our own southwestern deserts of New Mexico, Arizona and Nevada. Perhaps because of its more purely scientific interest, the venom of these lizards has received comparatively little study. The only careful investigations have been by Mitchell and Reichert, Santesson, Van Denburgh and Wight. While these authors have agreed as to the deadly nature of the venom of these lizards they have differed in many points as regards its mode of action. In a paper of some two hundred and forty-

four pages issued by the Carnegie Institution of Washington¹ one finds a series of articles in which are set forth the results of investigations of the poison glands and venom of the poisonous lizards of the genus *Heloderma*. These articles are by Leo Loeb and a large number of collaborators who made use of the Laboratory of Experimental Pathology of the University of Pennsylvania.

The anatomy and histology of the poison glands are described and it is stated that *Heloderma horridum* has the same anatomical arrangement as has been described in the case of *H. suspectum*. It is shown that pilocarpine increases the flow of venom and that transplanted portions of the gland retain their toxic character. Venom was not found in the blood or organs of *Heloderma*, except in the poison glands. It would thus appear that the venom is formed in these glands, not selected and excreted by them, and that there is no internal secretion of venom.

Gila monster venom affects mainly the central nervous system, and death is mainly due to paralysis of the respiratory center. There is a marked primary fall in blood-pressure of vasomotor origin. Diminution in the flow of urine is merely the result of the decrease in blood-pressure. Structural changes in the tissues of the poisoned animal are very slight, but extravasations of blood sometimes occur.

Gila monster venom is stated to cause hemolysis only in the presence of some activator such as lecithin and certain blood sera. It has no cytolytic power except upon the erythrocytes.

Heloderma is immune to its own venom. That is not due to the presence of antitoxin in its circulation.

Dr. Alsberg “succeeded in obtaining the *Heloderma* venom in a state in which it no longer gave the biuret reaction, thus proving

¹“The Venom of *Heloderma*,” by Leo Loeb, with the collaboration of Carl L. Alsberg, Elizabeth Cook, Ellen P. Corson White, Moyer S. Fleisher, Henry Fox, T. S. Githens, Samuel Leopold, M. K. Meyers, M. E. Rehfuess, D. Rivas and Lucius Tuttle, Washington, D. C., May 10, 1913.